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Energy Transition in India – Impact on Thermal Plant Operation

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Abstract
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India, with a population of 1.3 billion people and a current GDP growth estimated to be over 7%, is the 3rd largest economy in terms of purchasing power parity. It is also the 10th most industrialized country in the world and the only country with prospects of at least 5% per annum average GDP growth for the next 50 years as indicated in the Goldman Sachs BRIC Report. The country has a favorable demography with almost 65% of the population being under 25 years of age. It has qualified technical man power that is estimated to be about 2.6 million engineers in addition to around a million software professionals. With an area of about 3.3 million Sq. Kms. and a coast line of about 7500 Kms and blessed with an average of 300 days of sun shine, the country is well placed to derive a lot of its electrical demand from Solar and Wind.

The current installed generation capacity is about 250 GW with 61% of the installed capacity being based on Coal fired power plants. Renewable energy capacity is over 37 GW and set to grow at a rapid phase.

The recently declared government target for renewable energy indicates that there will be a major increase in the installed capacity which is now expected to reach 175 GW by 2022.

At present, the per capita consumption of electricity in India is about 800 Kwh per year which is only about 1/4th that of China and about 1/8th the consumption in Europe. Nonetheless, India will become one of the largest emitters of carbon dioxide, since it is planned to add about 72 GW of coal fired plants in the 5 year period 2012-2017. With coal reserves estimated to about 126 billion tonnes, it is clear that India would continue to build power plants based on coal. However, there is an increased emphasis on energy efficiency leading to a policy decision to build only supercritical plants and encourage renovation of the older plants to achieve higher efficiency. The major thrust will, of course, be on the National Solar Mission, which aims to add 100 GW of solar power by 2022. This target may be further revised upwards in view of the recent Government declaration to cut emissions by 35% by 2030 as compared to 2005. There is also a plan to add further 15 GW of wind power to achieve the target of 100 GW by 2022.

With the enhanced demand for power, the Transmission and Distribution network would required to be upgraded and capacity increased. At present, owing to inadequate transmission infrastructure there is surplus power capacity in the North which cannot be transmitted to the South. The rapid increase in large solar and wind capacity in certain parts of the country will

further distort the Transmission and Distribution requirements. The cyclical demand for electricity is also subjecting the existing coal fired plants to rapid load changes which requires a new operating regime for plants which were built as base load plants. One major effort in the direction is the German assisted "Green Corridor Project" for which the Government of Germany has committed one billion Euros. Concurrently a number of other initiatives like 100 'Smart Cities' are also planned.

The sector is plagued by the financial ill health of the distribution companies which are largely State owned and are pressed at the State level to provide electricity free of cost or at unremunerative rates to certain sections like farmers. Policy initiatives to restore financial discipline are now sought to be enforced.

The world recession, including the cascading efforts of the slowdown in China, have also affected industrial growth in India which has been flat in recent years. This in turn, leads to poor power plant load factor of the existing plants and this has created financially stressed assets among the recently constructed power plants in the private sector.

Likewise the large capacity of about 25 GW of gas fired power plants are uneconomical because of non availability of domestic gas at reasonable prices. While India has large reserves of gas, they have yet to be effectively extracted and gas availability for power production is not high on the priority.

India is one of the few developing economy which currently has a growth rate of over 7% and has caught up with China which is slowing down. The demand for energy will continue to grow and the decreasing capital cost of Solar PV will lead to a recasting of sector wise electricity generation targets. The presentation will highlight the developments in the energy matrix, the challenges which are likely for the industry and the opportunities which will become available.